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How to Salt Fish

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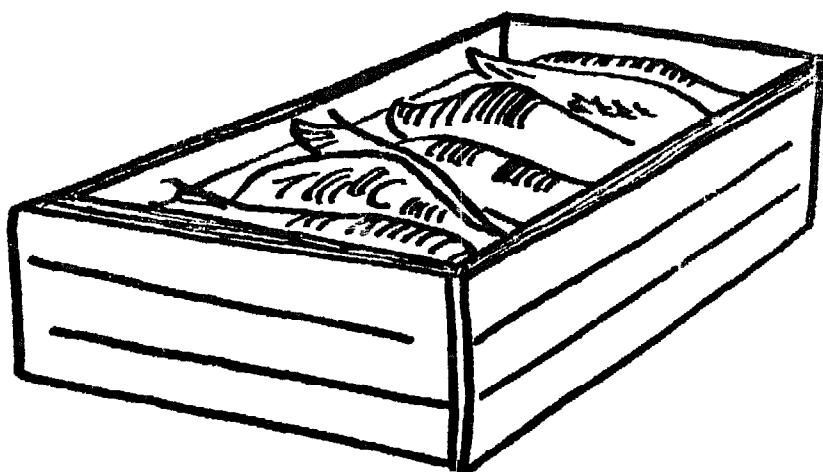
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V I T A

Village Technology Handbook
Food Section
Chapter 24

HOW TO SALT FISH



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The Village Technology Handbook is a project of VITA (Volunteers for International Technical Assistance) to provide a central source of basic technical information on devices and methods useful in village improvement programs.

The Food Section of the handbook is being prepared by members of the Sub-Committee for International Technical Assistance of the Institute of Food Technologists.

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Village Technology Handbook
Food Section

Chapter 24: HOW TO SALT FISH

By Daniel Casper*

I INTRODUCTION

A. Experience. Salting, one of the oldest methods of preserving food, is an art as well as a science. The process of salting fish is influenced by weather, size and species of fish and the quality of salt used. Therefore, experience is needed to adapt the process outlined here to your situation. Start by salting small lots of different varieties of the available fish. By salting small amounts of fish at first, you will learn how much time is required for each step. Salted fish, if properly packed to protect it from excessive moisture, will not spoil.

B. Quality and Cleanliness. Of special importance are:

1. the quality of the fish to be salted - the fish must be top quality; salting will not help poor quality, old or rotten fish; and
2. cleanliness in all operations - all water used must be unpolluted; all waste must be removed from working and drying areas; whatever comes in contact with the fish, including all the equipment, must be kept clean.

C. Caution. One word of caution: Start by salting non-fatty, white-meat varieties of fish. The salting of fatty fish brings up problems of rancidity, rusting and spoilage which can be handled better after you have experience in salting.

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II EQUIPMENT

A clean sharp knife.

Salt: the amount varies with local conditions, but figure about 20 pounds for 100 pounds of raw, prepared fish.

Clean containers for washing fish.

Clean, flat working surfaces; e.g. tables.

Clean containers for removing waste.

Waterproof vats: one or more, depending on the amount of fish to be salted. The dimensions are not too important; a good size is 6 feet long by 5 feet wide by 3 feet deep. But fish can be salted in a container as small as a wide-mouthed glass jar. Metals other than stainless steel should not be used. Wooden boards will work because moisture will swell the wood and seal it effectively.

Clean boards and weights (for pressing).

Clean slats or lines for hanging fish (see paragraph III D 3).

Portable thatch-roof shelters or small roofed sheds (see paragraph III D 4).

III PROCEDURE

The process of salting fish has four operations:

- A. Preparing the fish.
- B. Salting.
- C. Washing and drying to remove excess salt.
- D. Air drying.

A. Preparing the Fish

1. Beheading and Gutting. Fish should be gutted and beheaded as soon as possible after catching.
2. Beheading. Remove the head by cutting it off on a slanted line following the gills. Sharks can be beheaded at the last line of gill slits. (Only the "wings" of rays or skates are usually considered edible). Fish which weigh a half pound or less do not have to be beheaded but they should generally be gutted. Local custom will determine whether or not they should be beheaded.
3. Gutting. In gutting a fish, cut from the gill cavity along the ventral fold to the anal vent (see Fig. 1). All the guts must be removed. It is also good commercial practice to remove the black membrane located in the visceral cavity of many species.

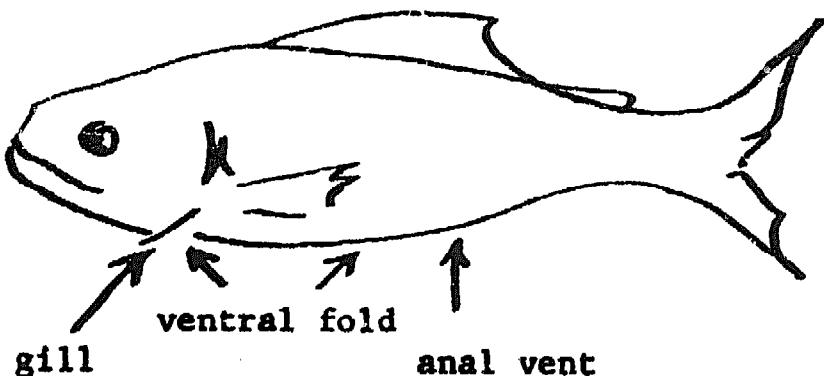


Fig. 1. To gut fish, cut from gill cavity along ventral fold to anal vent.

4. Bleeding. All species of fish must be thoroughly bled: if the head has not been removed, cut the throat; remove the gills and all blood vessels. Blood clots can cause

discoloration, as well as bacterial infection which would make the fish unfit for eating.

5. Cutting. The shape into which the fish is cut depends on local custom. But, for a rule of thumb: under a pound, the fish may be left whole; from 1 to 10 pounds it should be split in half from head to tail (see Fig. 2); over 10 pounds, split the fish in two again from head to tail. The collar bone behind the gills should be left intact when a fish is split in half.

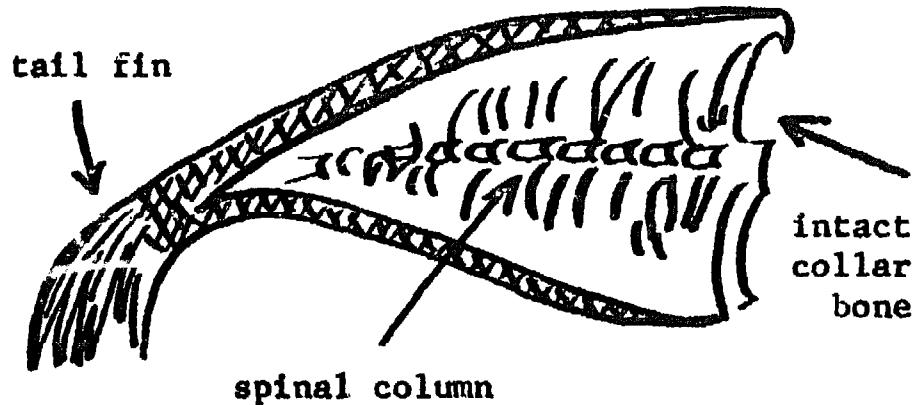


Fig. 2. One to 10 pound fish.

B. Salting.

1. Sprinkle a thin layer of salt, just enough to completely cover the bottom of a waterproof vat.
2. Place a layer of fish, flesh side up, with enough room for each fish to avoid over-lapping. Try for a neat pattern, alternating head to tail and tail to head.
3. Cover the fish with salt - a thin layer, but with no open spaces.
4. Repeat Steps 2 & 3 up to two or three layers of fish from the top of the vat.

5. Reverse the fish, packing them SKIN side up to the top of the vat, alternating with layers of salt. The top layer must be salt.
6. The salt will extract moisture from the fish, forming a brine. Use boards and weights to keep all the fish under the salt.
7. The brine must be kept saturated (90 Salinometer- or when no more salt can be dissolved) at all times. As moisture is extracted, more salt must be added to keep the brine saturated. Too little salt will cause the fish to spoil. Too much will detract from the flavor and cause rehydration.
8. As moisture is extracted from the fish, the level of fish in the vat will fall. More fish can be added, skin side up - alternating a layer of fish with a layer of salt, the top layer always being salt. Continue to add salt to keep the brine saturated.
9. Length of Cure. The fish are "struck through," or thoroughly impregnated with salt, in 12 to 15 days in warm weather. In cold weather, the fish should stay in the brine for 21 days or more; in the tropics, 15 days may be a good limit. The higher the temperature, the quicker the fish will be struck through. When properly salted, the flesh of the fish is translucent. It is firm but yields to gentle pressure. It has a whitish salt cover. An odor of fish and brine should prevail. There should be no spoilage odors.

C. Washing and Drying to Remove Excess Salt.

1. When the fish are struck through, they are removed from the vat and washed in unpolluted sea water or fresh brine to remove excess salt.

2. Then place the fish on flat surfaces, using any arrangement of boards and weights to press them as flat as possible: a. to remove excess moisture; and b. to make the fish thinner, which will reduce the length of the air drying process and improve the appearance of the fish for marketing.

D. Air Drying.

1. The final drying can be done either by sunlight and natural air currents or by artificial heat and air currents generated by fans. In most areas, in the proper season, drying can be done outdoors in the sun and fresh air. Choose an open area to get the most sunlight and wind. Avoid swampy areas, locations near human or animal waste and, especially, fly-breeding areas.

2. When freshly salted fish is first brought out to dry, there is danger of sunburn. If fish is exposed at this stage to the direct rays of the sun, it may harden on the outside and turn yellow. This will keep the inside from drying properly. To avoid this, keep the fish under shade or semi-shade for the first day.

3. After the first day, expose the fish to as much sunlight and wind as possible. One method is to lay the fish on triangular slats - so that it rests on the least possible amount of surface - flesh side facing the sun (see Fig. 3). Another method is to hang the fish by the tail (see Fig. 4).

4. Protect the drying fish against dampness. The fish can be sheltered by portable thatch roofs (see Fig. 5) or moved into small roofed sheds built nearby for protection from rainfall and night-time dampness. The fish should be free of discoloration, mold or

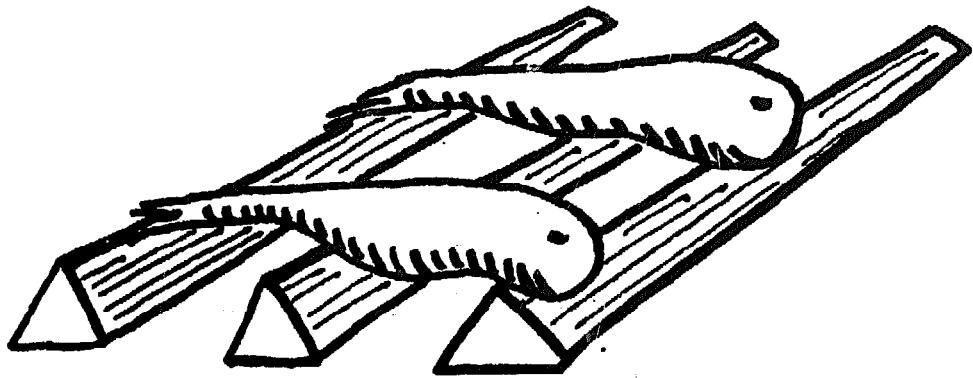


Fig. 3 Fish drying on triangular slats.

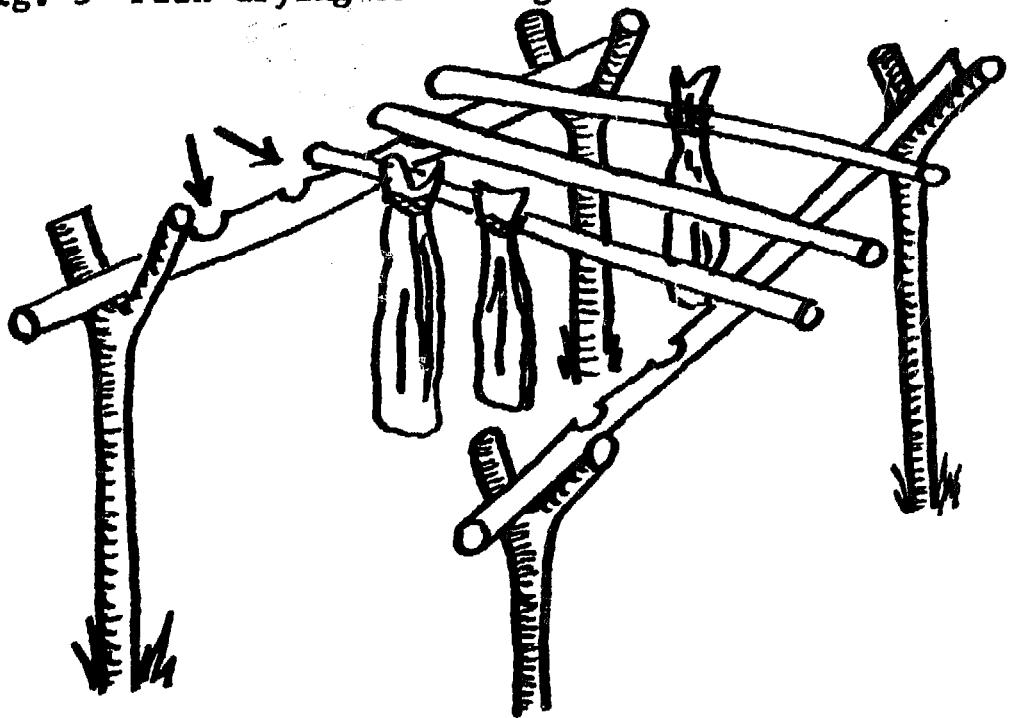


Fig. 4 Fish hanging to dry. The height and strength of the forked stakes and cross poles depends on the size and weight of the fish. The cross poles could be carried to a shelter where permanent forked stakes are set up.

other defects. Split fish should not have ragged edges.

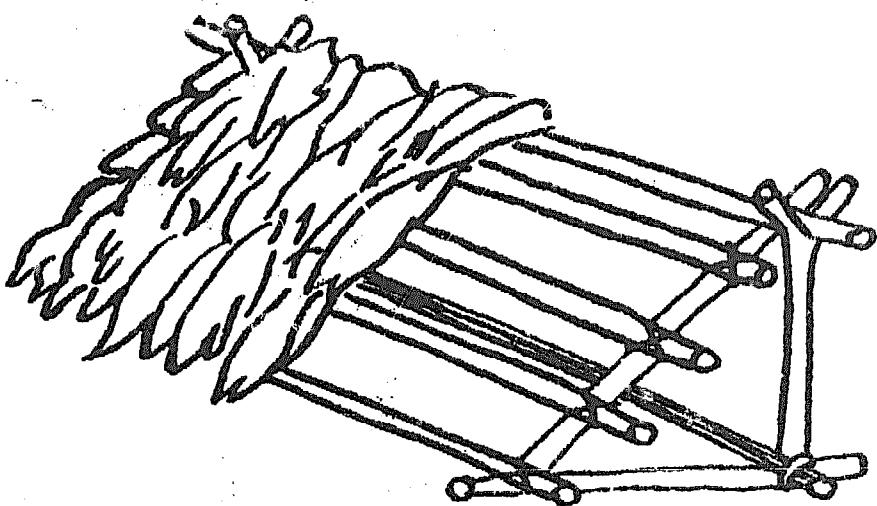


Fig. 5 Portable thatch roof shelter. Lean-to's could be used in pairs for easier carrying if built large, or lashed together into a single roof if built small. These would be more appropriate as protection for the triangular slats, while sheds would protect drying racks for larger fish or where the ground is damp (see Fig. 4).

5. Length of Process. Generally, six warm days with winds of more than three miles per hour should dry the fish enough to prevent spoiling in storage or shipping, provided the fish is properly packed to protect it from excessive moisture.

IV IMPORTANT POINTS TO REMEMBER

1. Use only top quality fish.
2. Work cleanly.
3. Work fast.

4. Keep the brine in the salting vats saturated
- when in doubt, add more salt.
5. Try to follow local custom in style and
length of cure.
6. All water used must be unpolluted.

V USING SALTED FISH

Usually salted fish is soaked overnight, with at least one change of water, to remove most of the salt before it is eaten. The longer it is soaked, the more salt is removed. Then it is used in the same way as fresh fish, except that it is not good for frying.

VI GLOSSARY

Visceral Cavity: the hollow in the body of the fish which contains the guts.

If you need further information on the material in this chapter, VITA (Volunteers for International Technical Assistance) can send you more information. If you have specific questions, VITA can put you in contact with an expert who can answer them. VITA is an international association of scientists, engineers, technicians and businessmen who volunteer their spare time to consult on questions from persons in developing areas.

Simply send your request to:

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To help the VITA volunteer who answers your request, you should:

1. Be quantitative -- give measurements, costs, materials available, sketches when possible.
2. Describe the best solution, if any, found nearby and any limiting cultural factors.
3. Indicate a deadline for action. You will hear directly from the VITA volunteer; maintain contact with him; inform the VITA office if correspondence stops.
